# Workshop 1 – Technical aspects of coastal nature restoration activities and management planning

Chair: Jean-Louis Herrier
Rapporteur: Hannah Van Nieuwenhuyse

Flemish Agency for Nature and Forestry, Nature Division, Coastal Conservation Unit
Zandstraat 255, 8200 Sint-Andries, Belgium
E-mail: jeanlouis.herrier@lne.vlaanderen.be; hannah.vannieuwenhuyse@lne.vlaanderen.be

## Introductory statements *(for full-text articles see Proceedings)*

1. Dynamic dune management in practice – remobilization of coastal dunes in the National Park Zuid-Kennemerland in the Netherlands (*Terlouw & Slings*)
2. Multi-technique survey of fine sediment transport and deposition in a managed estuary: the Authie Estuary, northern France (*Marion* et al.)
3. Development of a decision support system for LIFE-Nature and similar projects: from trial-and-error to knowledge based nature management (*Brouwer* et al.)
4. Managing the Flemish dunes: from eco-gardening to mechanical disturbances created by bulldozers (*Lemoine & Faucon*)

## Major questions/provocative statements

1. Until recently, ***artificially fixing the sand drift*** in the coastal dunes by planting Marram grass (*Ammophila arenaria*) and banishing grazers was a nearly obsessive activity of most coastal dune-managers. Now, stimulating or even mechanically creating (new) dynamics in the fixed dunes seems to become the new hype for dune-managers. But is this remobilization, that often implies the active destruction of valuable 'grey dune' and scrub, on the long run a useful and sustainable option, taking into consideration the possibility that climate change and increased atmospheric deposition accelerate the spontaneous colonization of bare sands by the vegetation, especially by Marram grass?

2. A '***managed estuary',*** isn't that a contradictio in terminis, as an estuary should develop, change and roam freely, governed by water, winds and tides only?

3. Does the fear for failure justify the development of '***decision support tools'***, a development that risks to paralyse or indefinitely delay intended actions of nature restoration? How many years or decades are needed to acquire a full understanding of the functioning of a whole ecosystem? Columbus did not have a 'decision support

tool' when he embarked on his journey to discover a new maritime navigation way to India...

4. Are these 'mechanical disturbances', especially when they need to be repeated in time, on the long run not transforming dune slacks into lakes? Shouldn't we accept that along some stretches of coast – such as that of Belgium and the easternmost part of northern France – the remaining not built upon space has become too limited to allow large-scale dynamics, so that ***'eco-gardening'*** is the only sustainable and advisable tool to maintain or restore biodiversity?

5. Nature management in coastal dunes and salt marshes is a widely spread practice among most European coastal nations, but what about ***nature management of tidal sandy beaches and their subtidal extensions***?

## Discussion/answers to questions

### *1. Is remobilization of dunes a useful and sustainable option?*

*(based upon introductory statement 1)*

### *Discussion*

**Jean Favennec** states that the key for keeping the dune-systems mobile lies in maintaining the supply of sand of marine origin from the sea-wall. There is a contradiction between the urge of keeping dune-systems mobile and the general policy of precisely stabilizing foredunes and keeping the coastline on its place. Public opinion does not accept the mobility of the coastline because of reasons of coastal protection. The result of this is that dune-managers are on most places constricted to eco-gardening, whether they like it or not. Mobile dune-systems are only sustainable in natural areas that are very large, like Slavinsky National Park in Poland.

**Marc Leten** does not agree with the view that sand-supply from the sea-wall is the prime condition for sustainable mobile dune-systems. He argues that the central drifting dune of the 'Westhoek' at the Belgian coast (an area of 80 hectares) probably has developed at the beginning of the 19$^{th}$ century by destabilization of a formerly stabilized inner dune-system. This huge drifting sand dune has kept its dynamics for two hundred years independently from the seafront dunes and without any sand supply from the beach. Only in recent years a decrease in dynamics has occurred, probably due to climate change or the decimation of the rabbit population.

**Haim Tsoar** thinks that people do like the landscape offered by huge areas of bare sand. There are also ecological reasons why sand drift dynamics should be maintained, such as the conservation of a specialised xerophilic and psammophilic fauna. The question that has to be asked is how much vegetation do we have to remove to keep sand drift alive? Along European coasts, dune systems show a tendency to be increasingly stabilized by vegetation. A possible explanation for that is climate change. There has been an increase in rainfall registered from 700 mm to 900 mm. But this cannot explain entirely the

observed increase in vegetation. Probably part of the explanation lies in a possible change in wind-pattern.

**Paul Rooney** asks what the meaning is of concepts like 'sustainability' or 'natural'. Important for dune-managers is to realize – as Peterken has pointed out – that there is a 'past natural', a 'present natural' and a 'future natural' situation.

**Patrick Doody** agrees that the availability of sediment together with wind-patterns are essential elements in the dynamics of most dune-systems, but points out that in Finland and elsewhere in the Baltic region there are huge mobile dune-systems without any connection to the sea. Anyway, there is not one dune-system in Europe that has not been influenced by human activity and probably lot of sand drifts resulted from human activity. Although it could be interesting to keep sand drift dynamics in some areas, he warns that it would be dangerous to come to the conclusion that destabilization has to take place everywhere. Sometimes our preference goes to the maintenance of grey dunes instead of the restoration of sand drift.

**John Houston** asks how fast the Dutch large dune destabilization projects are stabilizing again.

**Bas Arens** answers that this is a matter of scale. There are parts that stabilize quite fast and others that do not. The reactivation of sand drift has to be over-dimensioned to be sustainable. If you want to restore sand drift for decades, huge areas have to be destabilized. Also in the first period after the initial destabilization, there has to be an intervention every other year to keep the dynamics going. The main problem for the sustainability of restored sand drift is the occurrence of roots in the soil. He also thinks that sand supply from a dynamic seafront is not really needed for the maintenance of a mobile dune landscape, and points to the example of the Rabjerg Mille in Denmark.

**Marc Leten** reminds that the aims of remobilization of dune-systems are not limited to reactivate sand drift as such but are also to allow the development of new blow-outs and eventually wet dune slacks. One of the first pioneer species that appears in wet dune slacks is Sea-Buckthorn. To maintain biodiversity in the newly formed wet dune slacks, more classical management tools, such as weeding seedlings of shrubs and trees or mowing, are needed. It is clear that remobilization on its own is not sufficient for the restoration or maintenance of biodiversity in a dune system.

## *Conclusions*

*To get dynamics back into a stabilized dune-system in a sustainable way, the initial measures of remobilizing the dunes have to be taken on a large enough scale and to be followed up by recurrent measures in the first decade after the initial remobilization. The lack of new sand supply caused by the stabilization of the seafront dunes for coastal protection purposes could on the (very) long run possibly stop the sand-drift dynamics. A warning was given: although sand-drift is a fundamental process in the functioning of coastal dune-systems, remobilization should not in every situation and every system be regarded as an appropriate management measure.*

## *2. A 'managed estuary', isn't that a contradiction in terminis, as an estuary should develop, change and roam freely, governed by water, winds and tides only?* *(based upon introductory statement 2)*

### *Discussion*

**Roger Morris** mentions that the present natural driving forces of estuaries are affected by climate change and sea level rise. That makes it necessary to manage estuaries, not only from a conservation point of view but also for human purposes. In estuaries extreme actions will be needed.

**Robert Jentink** points out that in the Netherlands there are no more natural estuaries. All big stream-mouths are adjacent to large harbours. The presence of harbours limits the possibilities for allowing natural patterns and processes in the estuaries. The Westerschelde was once a large estuary, but its course is now not natural anymore: the river is no longer free to go where it wants to go. Active management, call it eco-gardening, is needed to maintain or restore salt marshes in a controlled estuarine environment.

**Geert Raeymaekers** reminds that the European Habitat Directive urges the member-states to keep (or restore) the estuarine habitats in a favourable state of conservation. This could imply that the space where estuarine processes can occur should be increased. The management of estuarine systems should not be reduced to just a static eco-gardening.

**Stephen Worrall** says that, taking into account the effects of geomorphology and climate change, estuaries might in the future be less managed. The present management actions should be designed to allow the estuaries to manage themselves in the future.

**Claire Marion** observes that estuaries are very attractive to humans for economic activities that are often not compatible with the ecological functioning of the estuary. Problems are caused by the large scale of natural processes and the local scale of political decisions. As an example, politicians will quickly decide upon actions to stop erosion, but in doing that will not take into account the possible consequences of their actions for the natural functioning of the estuary on a larger scale. Local actions that were not well-prepared, often displace instead of solve the problems. A better understanding of the global functioning of the estuary is necessary for a more appropriate management.

**Rogier Kuil** says that the maintenance of a 'completely' natural system is only possible in small estuaries. The industrial and other human activities in the large estuaries limit the possibility for nature development in these large estuaries to eco-gardening. But this should not be negatively perceived: a great biodiversity can be achieved on even a small scale.

**Roger Morris** does not agree with that point of view. In large estuaries large-scale works into nature development are being executed, for instance in the estuary of the Humber.

**Stephen Worrall** points out that political decisions are often taken on a short term, while the management of an estuary needs a long-term vision. In the UK, the time horizons on which estuaries are managed are being extended to hundreds of years. Fixing an estuary for actual economic interests is asking for trouble. Economic activities should be relocated to give more space to the river.

**Robert Jentink** answers that in the Netherlands it proofs to be very difficult to convince people that land should be given back to the sea or that an estuary should be given more room. Even when action is needed for their own safety, inhabitants of the water catchment area are usually firmly opposed to such plans.

**Stephen Worrall** emphasizes that port industries should in their own interest shift from the present short-term management to long-term vision and management**.**

**Pat Doody** remembers a cartoon about climate change on which Saint Paul's cathedral is immersed. The barrage on the River Thames can only resist a 400 years event. The dikes in the Netherlands are designed to resist a 4000 years storm. But the more the defences against flooding are being raised, the more catastrophic the results of a more than 4000 years event will be. We have to make politicians understand that in the wake of the sea level rise, defences against flooding cannot be raised up indefinitely. Relocation of activities is necessary for human safety.

## *Conclusions*

*Management of estuaries should give the river more space. At present, this is often hampered by the economic activities taking place as most important harbours are located in estuaries. Sometimes this restricts the possibilities for nature-restoration and management in estuaries to 'eco-gardening'. In a long term, sea level rise will unavoidably force economic activities to relocate. Therefore, a managed retreat of the coastline should be considered. Especially important in this process is the perception by the public opinion and political decision-makers. The public opinion and the politicians have to be convinced that giving more space to the river is not only good for nature, but also a necessity for the safety of human populations against floods. Communication is essential.*

## *3. Does the fear for failure justify the development of decision support tools?* *(based upon introductory statement 3)*

### *Explanation*

Does the fear for failure justify the development of a 'decision support tool' that risks to paralyse or indefinitely delay intended actions of nature restoration? How many years or decades are needed to acquire a full understanding of the functioning of a whole ecosystem? Columbus did not have a 'decision support tool' at his disposition when he embarked on his journey to discover a new maritime navigation way to India … As everybody knows he failed to reach India, but discovered the Americas. Was such a 'failure' not worth a trial?

### *Discussion*

**Gert-Jan van Duinen** explains that there is a need of exchange of information between scientists of different disciplines and countries, and that decision support systems can help to make this information easily available. He illustrates his statement by different examples of unsuccessful nature management actions: the restoration of ponds for the Natterjack toad (*Bufo calamita*), dismissing the need of sufficient terrestrial habitat for feeding, and the failing management of some grasslands and heather that kept on degrading under the influence of atmospheric deposition of nutrients. A decision support system should help not to forget any essential factor.

**Jean-Louis Herrier** wonders whether the fact that restoring some ponds was not a success for the Natterjack toad has to lead us to regret the creation of those ponds. Undoubtedly those ponds will have been favourable for other species, such as aquatic plants and insects. Even if the initial main objective is not reached, other spin-offs of the action can make the effort worth while. Will the yearning for certitude through a decision support tool not lead to a stand-still?

**Robert Jentinck** thinks that a decision support tool could be helpful, but also that it is a good thing to learn from mistakes that have been made. He pleads for a tool that would be a support system, but not a decision system. It must not become something on which we rely totally so that we will not dare to try new things anymore.

**Geert Raeymaekers** pleads for trial and error.

**Jean-Louis Herrier** points out that monitoring the trial and error allows to acquire the necessary knowledge to avoid errors in the future.

**Marc Leten** compares the decision support tool with a cooking book, but a cooking book for a restaurant that will not obtain a star in the Michelin guide. The present legislation, especially the European Bird and Habitat Directives, are favouring cooking book methods in nature management. To get European funding, nature management actions have to target species from the annexes of the European directives (e.g. the already mentioned Natterjack toad). In that way managers tend to loose an overall view

of the functioning of the whole ecosystem, which should be the main focus for the managers.

**Jean-Louis Herrier** points to different approaches in different countries. In the UK, a lot of attention goes to species, while in Flanders nature management is mainly inspired by target-habitats. But lists of target habitats can also lead to a cooking book approach.

**John Houston** is aware of the fact that in the UK too much attention seems to go to the maintenance of some rare species. But most of the time the target species that are chosen are indicator species for the state of the ecosystem and their maintenance status tells us more about the biodiversity that is typical for the physical environment in which the indicator species occur. There is a difference between what one studies and what one presents.

**Jean-Louis Herrier** reminds to the subject of the discussion: a decision support tool. To illustrate his fear about an abusive way of decision support tools, he gives the example of the partially failed demolition-project of the Home Theunis in the nature reserve of 'Ter Yde' at Oostduinkerke (Belgium). One of the objectives of the demolition of this building was the restoration of sand drift. But a couple of years after demolition took place, the sand drift was stopped by the accumulation of small debris on the surface of the site where once the building had stood. On the other hand where the building once stood, the open space is now restored, rainwater is allowed to infiltrate the sandy soil, dune plant species grow, wheatears forage, disturbance of the natural area by inhabitants or visitors of the former building is avoided etc.. If we had a decision support tool at our disposition, perhaps the uncertainty about the feasibility of restoring the sand drift would have kept us doubting about the usefulness of demolishing the building. Because of those doubts the building would perhaps never have been demolished and nature would not have had the other benefits of the demolition.

**Haim Tsoar** asks how many years are needed to fully understand an ecosystem? Most field-studies just last only 3 to 4 years and then conclusions have to be reached. But the reaction of the system upon an action takes often much more time. There is a need for long-term ecological research and for long-term monitoring over the whole world, to be able to give an answer to questions such as what is the reaction of the system to climate change.

**Paul Rooney** pleads for building up knowledge by collecting information about trial and error through networking. Exchanges of papers about the results of Life–projects are one way of exchanging and building collective knowledge.

**Freek Zwart** emphasizes the importance of trial and error. The management of the island of Terschelling (the Netherlands) consists of 30 years of trial and error and the results of this are satisfactory. Nature management should not be reduced to a kind of building-contract. It is impossible to predict everything. Nature managers have to accept that the final outcome of management actions can never be fully predicted and to trust on the green fingers of skilled personnel on the site.

## *Conclusions*

*Everybody agrees that a decision support tool is useful as long as it keeps to supporting decisions and does not start making decisions. Decisions should always be based on the best available scientific knowledge but it is impossible to anticipate with full certitude the response of the ecosystem to management measures. So trial and error are to a certain extent unavoidable to build up knowledge from practical experience.*

## ***4. Is eco-gardening preferable to large-scale mechanical disturbances in order to maintain or restore biodiversity in small-scale dune areas?*** *(based upon introductory statement 4)*

## *Explanation*

Are these 'mechanical disturbances', especially when they need to be repeated in time, on the long run not transforming dune slacks into lakes? Shouldn't we accept that along some stretches of coast – such as that of Belgium and the easternmost part of northern France – the remaining not built upon space has become too limited to allow large-scale dynamics, so that 'eco-gardening' is the only sustainable and advisable tool to maintain or restore biodiversity?

## *Discussion*

**Jean Favennec** points to the importance of scale. In some parts of France, conservationists try to remobilize a fixed dune (where there is enough space left for allowing the dune to get on the move), while in some other places local communities want to stabilize mobile dunes that threaten buildings or roads. It is necessary to have a global vision.

**Leon Terlouw** is afraid that repetitive excavations on the same spot could turn humid slacks into lakes. It is not only necessary to differentiate management-tools according to the scale, but also to differentiate them in time.

**Marc Leten** agrees that mechanical methods could be equivalent to large-scale natural processes such as marine intrusions and sand drift, but points out that these excavation measures have to be followed up by eco-gardening. If we just excavate an area, quite rapidly the resulting (artificially restored) wet dune-slack will be invaded by Sea-Buckthorn that will supersede the target pioneering species and habitats. To give the pioneering species and habitats a chance to last for more than just a couple of years, weeding the seedlings of Sea-Buckthorn and mowing young scrub will be needed. He wonders whether the space is available to start excavating a new dune-slack every time an older dune slack has been overgrown by shrubs.

**Paul Rooney** reminds us that coastal dunes are an anthropogenic landscape and that this fact allows us to show some creativity in the approaches of managing the dunes. He asks what we want to obtain on the long term and how we do sell our 'products' to the

European Commission. He warns not to let nature management get into a legal based straight-Jacket.

**Jean Favennec** says that larger areas can be managed in a less interventionist way, while smaller sites can need a more intensive type of management.

**Guillaume Lemoine** clarifies that the excavations taking place in some French dune areas are not repeated on the same spot. Slacks do not risk to be changed into lakes, after all. Excavations are executed on different locations all 10 to 15 years in order to have different stages in vegetation-succession on different locations within the managed area. Besides these excavations, eco-gardening is still carried on for other locations that have been managed by cutting and mowing for a longer time.

### *Conclusions*

*We have understood from our French colleagues that they have not abandoned eco-gardening in favour of large-scale mechanical disturbance. Instead they are now using mechanical disturbances besides the eco-gardening. As these mechanical disturbances are not recurrent on the same location, but spread in space as well as in time, dune slacks will not be transformed into lakes. Doubts remain about the choice of just letting vegetation succession progress without interference after the mechanical disturbance was executed.*

## *5. Nature management of tidal and subtidal zones of sandy beaches*

As there were no marine biologists present in this workshop, the aspect of controlling exotic invaders was but briefly mentioned. An important statement, made by **John Houston** and **Geert Raeymaekers**, is that efforts should be made to integrate scientific research and monitoring of geomorphological processes at sea and on shore. More precisely the attention should be drawn to the relation between the formation of tidal sandflats in the shallows and dune formation on sandy beaches, as well as to the exchange of sediments between shallows and the beach.